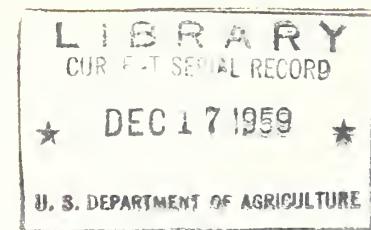


Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.



3

The GREEK RAISIN Industry

7a/ FAS M-75 December 1959

7a/ Foreign Agricultural Service
U.S. Department of Agriculture

Foreword

There has been a striking expansion in the production and export of Greek raisins (sultanas) since the war. Greece is now one of the world's leading exporters of sultanas.

This survey reported on in this publication was undertaken to develop information which would aid the U. S. trade in evaluating this newly expanded Greek industry and to provide some insight on its potential growth.



D. M. Rubel, Director
Fruit and Vegetable Division

Acknowledgments

The contributions of Costas M. Athanassiades, Agricultural Assistant, American Embassy, Athens, were most helpful in the preparation of this report. He secured much of the data, and was of great assistance on a field trip that he made with the author.

Also the whole-hearted cooperation of the Greek Government officials, packers, and agricultural specialists interviewed is greatly appreciated. The Greek trade was most helpful in freely discussing their operations, costs, and industry problems.



DHIMERÍSMATA (DIVISIONS) AND NOMOI (PROVINCES)

THRACE (ΟΗΙΤΙΚÍ THRÁKI)

- 1 ÉVROS
- 2 RODHÓPI
- 3 XÁNTHI
- 4 KAVÁLLA
- 5 KASSÍPES
- 6 SERRES (SÉRRAI)
- 7 KÍLKIS
- 8 SALONICA (THESSALONIKI)
- 9 KHALKIDIKI
- 10 KASSÍPES
- 11 IMATHIA
- 12 PIERIA
- 13 KOZANI
- 14 KERÉRA
- 15 FLÓRINA

THESSALY (THESSALÍA)

- 16 TRIKKALA
- 17 LÁRISA
- 18 MÉGHNÍTA
- 19 MAGNÍSIA
- 20 IOÁNNINA
- 21 THESPROTIA
- 22 ÁRTA
- 23 PRÉVEZA
- 24 CORFU (KÉRKIRA)
- 25 LEVKÁS
- 26 CEPHALONIA (KEFALLINÍA)
- 27 ZANTE (ZÁKINTHOS)

CENTRAL GREECE (STEREÁ ELLÁS)

- 28 AÍTOLIA KAI AKARNAÍA
- 29 EPIRUS
- 30 ÓKRI
- 31 FTHÍOTIS
- 32 ÉVVOIA
- 33 VOÍOTIA
- 34 ATTICA (ATTÍKÌ)
- 35 ILÍA
- 36 KÁRIA
- 37 ARKADHIA
- 38 CORINTH (KORINTHÍA)
- 39 ARGOS (ARGOLIS)
- 40 MESSENIA (MESSINÍA)
- 41 LAONIA (LAKONIA)

AEGEAN ISLANDS (NÍSOI AIYAIÓU)

- 42 LÉSVOS
- 43 CHÍOS (KHÍOS)
- 44 SÁMOS
- 45 KHANÍA
- 46 KERÁVY
- 47 HERACLION (IRÁKLION)
- 48 LASÍTHI
- 49 KIKLÁDIES
- 50 ODEGANESE ISLANDS (OHOHEKÁNISOS)
- 51 DHOHEKÁNISOS

Contents

	Pages
Production.....	1
Varieties.....	2
Acreage.....	2
Producing areas:	
Crete.....	3
Location and topography.....	3
Climate and soils.....	3
Acreage.....	4
Yields.....	5
Volume of production.....	5
Cultural practices.....	5
Harvesting methods.....	8
Cost of production.....	10
Peloponnesus.....	10
Utilization:	
Alternative uses.....	12
Domestic disappearance.....	12
Exports.....	13
Processing:	
Packinghouses.....	15
Processing methods.....	16
Packaging.....	17
Costs.....	17
Grades.....	18
Export standards.....	19
Prices.....	20
Producer organizations.....	21
Government policy:	
Production and export goals.....	23
Export programs.....	24
Production aids:	
Support prices.....	25
Agricultural credit.....	25
Extension activities.....	26
Outlook.....	26

THE GREEK RAISIN INDUSTRY

By Stanley Mehr
Fruit and Vegetable Division

Greece is the world's largest exporter of dried fruits, and ranks with the United States, Australia, Turkey, and Iran as a major raisin exporter. In the marketing seasons 1953-54 through 1957-58, exports of Greek raisins averaged 51,270 tons annually, or virtually as much as the U. S. average volume in that period--51,763 tons. The 1958-59 exports were unusually low because unfavorable weather reduced the 1958 crop, but production and shipments are expected to be up again in 1959-60 and perhaps higher than ever before.

Greece sells its raisins mainly in Western Europe, the same market for which U. S. raisins compete. It is an important competitor in that market and could be increasingly so in the years ahead. Its production has more than doubled since the early postwar years, and promises to be considerably higher in the coming decade. Domestic consumption has not increased, so export supplies have grown. This is the pattern to be expected in the next few years.

Production

Greece produces one-ninth of the world's raisins and nearly one-fifth of the foreign raisin pack. Australia, Turkey, and Iran are the only foreign countries producing more:

	1953-57
	<u>1,000 short tons</u>
United States.....	197.9
Australia.....	76.1
Turkey.....	72.0
Iran.....	62.6
Greece.....	54.8
Spain.....	14.0
Union of So. Africa.....	8.2
Cyprus.....	<u>7.5</u>
Foreign total.....	295.2
World total.....	493.1

Greek raisin production has shown a remarkable increase since the end of World War II. The 1957 crop of 70,000 short tons was more than double the average production in the 1947-51 period of 30,800 tons.

Table 1.--Raisin production in Greece, average 1934-38, 1947-51, and 1953-57,
annual 1946-58

Year	Production	Year	Production
	1,000 Short tons		1,000 Short tons
Average:			
1934-38.....	30.3	1950.....	39.0
1947-51.....	30.8	1951.....	29.0
1953-57.....	54.8	1952.....	38.0
Annual:			
1946.....	21.0	1953.....	55.0
1947.....	26.5	1954.....	47.0
1948.....	25.0	1955.....	52.0
1949.....	34.0	1956.....	51.0
		1957.....	70.0
		1958.....	47.0

Varieties

The sultana is by far the principal raisin of Greece, averaging about 51,000 tons out of an annual total of 54,800 in 1953-57. ^{1/} The rest are rosakis and tachtas.

The sultana, also known as the Round Kechmish, is a seedless variety of grape closely related to the Thompson Seedless of California. (The Thompson is an Oval Kechmish or sultanina.) The rosaki is a large white-seeded grape of ellipsoidal shape, and is sometimes called the Dattier de Beirut.

Acreage

Greece has about 46,000 acres of sultananas--bearing and nonbearing--most of them on the island of Crete, mainly in the Iraklion district near the northern coast. Latest official figures are for 1956, from the Agricultural Bank of Greece:

Districts	Acres of sultananas	Percent of acreage	Number of growers	Acres per grower
Crete.....	28,926	66	23,328	1.2
Peloponnesus.....	14,512	33	9,506	1.5
Dodecanese.....	487	1	707	.7
Other.....	41	--	84	.5
Total, 1956.....	43,966	100	33,625	1.3
Total, 1955.....	42,450		32,373	1.3

^{1/} Unofficial estimates. Official production figures of the Ministry of Agriculture cover only sultananas. Export figures of the Ministry of Commerce, on the other hand, include all varieties, as does this report--for both production and export.

Acreage increased 3.6 percent between 1955 and 1956. Crete's rate of increase was probably the largest; its sultana acreage has been increasing for several years, but acreage on the Peloponnesus has apparently remained static or declined slightly.

It is striking that as many as 33,625 growers handle as little as 43,966 acres of sultanas--an average of only 1.3 acres per producer. On Crete where nearly 29,000 acres were cultivated in 1956, the average size of a sultana vineyard was 1.2 acres per producer. These remarkably small units of production are the main reason why sultana production and drying--in every phase--is a nonmechanized hand labor operation in Greece.

Producing Areas

Crete

Location and topography.--Crete is in the Aegean Sea 160 miles south of Athens. It is 160 miles long and 7 to 35 miles wide. The island has an area of about 3,200 square miles, or approximately 2,050,000 acres.

A chain of limestone mountains runs intermittently through the length of the island. On the northern side it declines moderately to a coastal plain of varying width; on the south side it drops steeply to a rocky shore.

The big Iraklion sultana-producing area lies in a relatively wide coastal plain, which extends southward from the city of Iraklion and adjacent northern coast in semicircle fashion. The northern limit of the producing areas is within sight of the sea. The southern limit is rarely more than 12 miles inland. Iraklion is roughly midway between the two other producing centers--Khania to the west and Sitea to the east.

Climate and soils.--Crete is characterized by hot, dry summers and mild, moist winters. The weather is well suited for raisin production.

The growing season is long; daily mean temperatures during the summer are high enough for proper development and ripening of the grapes; and low summer humidity minimizes the occurrence of fungus diseases. Temperatures during the winter are low enough to induce an adequate rest period but not severe enough to cause freeze damage. Also, since little irrigation is available, the winter rainfall is essential for the accumulation of soil moisture reserves for the growing season.

Monthly mean temperatures at Iraklion are as follows:

	°F.		°F.		°F.
January.....	51	May.....	68	September.....	75
February.....	52	June.....	75	October.....	67
March.....	55	July.....	78	November.....	61
April.....	61	August.....	79	December.....	55

Temperatures at Fresno, Calif., center of U. S. raisin production are somewhat higher in the summer and lower in the winter than at Iraklion. By comparison, the average July and January temperatures at Fresno are 81.3° F. and 45.5°, respectively.

The average annual rainfall at Iraklion is 20.3 inches. This is substantially higher than the annual average of 9.4 inches at Fresno. At Khania (western Crete) the annual rainfall is 27.8 inches and at Sitea (eastern Crete) only 16.3 inches. Monthly distribution of rainfall at Iraklion is as follows:

	<u>Inches</u>		<u>Inches</u>
April.....	1.07	October.....	1.52
May.....	1.08	November.....	3.92
June.....	.07	December.....	3.62
July.....	.04	January.....	3.37
August.....	.28	February.....	2.82
September.....	<u>.70</u>	March.....	<u>1.80</u>
Total, dry season	3.24	Total, rainy season...	17.05
		Annual total	20.29

About 85 percent of the soils in Crete are on limestone. Soils in the Iraklion area are also of calcareous origin, and in prewar soil testing, over four-fifths of the soil samples in the Iraklion district contained 10 percent or more of calcium carbonate. Most Iraklion soils are also rich in potassium. Available phosphorous varies widely, but nitrogen content is low.

The sultanas in Iraklion are grown on loamy soil, which predominates in the district. In Khania and Sitea stoney soils containing lime are used.

Crete's soils are generally suitable for grains, olives, and grapes. When irrigated, they are also suitable for a limited acreage of citrus, vegetables, potatoes, and bananas. However, without irrigation, the soils are too light to carry cotton or tobacco.

Of the three main crops that can be grown, grapes are the most intensive and yield by far the largest gross income per acre. Where the local conditions are precisely right for rosaki grapes, they are the most profitable grape that can be raised on Crete. However, sultana culture for raisin production is the most profitable type of viticulture on the island.

Acreage.--According to agricultural specialists and packers in Crete, total Cretan sultana acreage in 1958 was an estimated 30,500 acres--22,000 bearing and 8,500 nonbearing. The consensus among Cretan experts in 1958 was that 2,000 to 3,000 acres of sultanas would be planted in the next 3 to 5 years. This would mean a total bearing acreage by 1968--assuming no attrition--of approximately 33,000 acres. Much of the new acreage of sultanas has been at the expense of wine varieties of grapes, and to a lesser extent, of olives. Some wheat land has also been shifted into sultanas.

Yields.--The average yield in Crete is estimated at 1.9 short tons of raisins per acre. In the all-important Iraklion area it is estimated at 1.8 to 2.0 tons. In the western producing area around Khania, which is of limited importance, yields are said to be only between 1.35 and 1.55 tons per acre. In eastern Crete (Sitea) production is minor, but, because of irrigation yields are very high--about 2.75 tons per acre.

According to Cretan agricultural experts, yields are not decreasing as acreage increases. On the contrary, larger yields are expected in the future. This is attributed to (1) improving cultural and harvesting practices and (2) use of better land for new plantings.

Volume of production.--The average dried sultana production of Crete in the 5 years, 1953-57, is estimated at 41,000 short tons annually. This was 75 percent of Greece's annual sultana production of 51,000 tons.

According to unofficial estimates, the Iraklion area accounts for all but 7,000 tons of Crete's production. The Khania area is believed to produce about 2,000 tons of sultana raisins, and Sitea and scattered areas on the remainder of the island may account for the balance of 5,000 tons.

The average for Cretan production has been increasing rapidly, reflecting the maturation of new plantings in the Iraklion district. Production is expected to continue rising to a level materially above the 1953-57 average.

Assuming that the producing area increases to 33,000 acres by 1968, and that current average yields still apply, Crete's production of sultana raisins would reach a level of 63,000 tons, an increase of 11 percent over the bumper 1957 production of approximately 55,000 tons and 54 percent above the 41,000-ton average. Even higher production could result if any increase occurs in the per-acre yields.

Cultural practices.--In considering the level of technology of Cretan raisin producers, one has to bear in mind that farms are very small and fragmented, the capital resources of the farmers are meager and, the educational level is low.

According to a 1948 survey, the average size of a farm was 9.2 acres. About 70 percent of the farms were smaller than 10 acres. Furthermore, the average farm consisted of nine scattered parcels of land--inheritance customs being responsible for excessive division of farms.

As an indication of the limited financial resources of the Cretan farmer, the average value of tools and equipment amounted to \$32 per farm in 1948. The average value of marketings per farm--for those selling farm products--was \$194. The value of sultana producers' marketings was probably substantially above this average. However, only 5 percent of farms selling products grossed over \$624 in 1948.



A new planting of sultanas—staked for spacing and support—near Iraklion, Crete, is being inspected by Edward J. Bell, U.S. Agricultural Attaché (right) and the author, Stanley Mehr.



Kostas Kefatos (right) of the Greek Ministry of Agriculture and Costas Athanassiades of the Office of the U.S. Agricultural Attaché discuss sultana drying racks near Iraklion, Crete. The low weed growth—in February—is characteristic of winter cover in Cretan vineyards.

As for educational background, in 1948 one-fourth of the household heads in Crete had not received any formal education and less than half had completed the fourth grade. Only 4 percent had completed high school. In the rural areas the educational levels were even lower.

Despite these serious handicaps, the Cretan sultana grower is able to obtain raisin yields comparable to those in California. This achievement is all the more remarkable since only a small proportion of the sultana acreage is irrigated.

Perhaps the main reason for the relatively high Cretan yields is the density of vines planted per acre. According to a 1948 survey, ^{2/} in the Iraklion district the average number of vines per acre ranged between 688 and 1,619, with about 70 percent of the communities averaging over 1,000 plants per acre. The average vine density for all of the communities was 1,118 plants per acre—about $2\frac{1}{2}$ times as much as the California density of

^{2/} Allbaugh, Leland G. Crete. Princeton University Press, Princeton, N. J., 1953.

approximately 450 vines to the acre. In other words, the spacing on the Iraklion district averaged $6\frac{1}{4}$ feet each way, compared with 8x12 or 10x10 feet in California. Such close planting is only possible because low summer rainfall and little irrigation limit excessive growth, severe pruning is practiced, and the grapes are dried in a drying yard.

Another factor contributing to good yields is the personal care given vineyards. In 1948 over 95 percent of the farm operators owned their farms, though some also farmed rented land. Coupled with personal operation is the smallness of the enterprises; as indicated earlier, the average sultana grower in 1956 operated only 1.2 acres of sultanas though this average may be larger now, particularly for the Iraklion district. Thus, the sultana grower and his family are able to lavish attention upon the vines, and may require hired help mainly at harvesttime.

It is perhaps pertinent that many of the sultana growers in Crete are from refugee families who were evacuated from Smyrna, Turkey after World War I. Under their culture, Smyrna (now Izmir) had developed into the world's leading raisin-producing area. After they were moved out, Smyrna's production declined considerably--in both volume and quality.

The vineyards in Crete are hand cultivated with a tool resembling a heavy hoe or mattock. Cultivation starts in late winter or early spring when a heavy stand of winter weeds, which could well qualify as a cover crop or green manure crop, is hoed under.

Pruning grape vines is a fine art among the growers. Each vine receives individual consideration and is pruned according to its vigor of growth and productivity. Head pruning is practiced. The vines are trained to a short vertical trunk which divides into a few short, heavy branches or "arms," each of which is terminated by spurs. The spurs are not more than a few inches long--only long enough to accommodate from 1 to 5 buds--depending on the vine's history. Vines are commonly pruned to 20 to 30 spurs. Neither stakes nor wire trellises are used; the vines are completely free-standing except for young plants which are temporarily supported by bamboo-like canes. Pruning starts in January and continues into February. Prunings are carefully made into neat bundles for household fuel.

Commercial fertilizer is widely used. Ammonium phosphate is the most common. Very little potash is needed in the main raisin districts. When mixed fertilizers, such as 8-8-8, are used, up to 1,100 pounds per acre are applied on poorer soils. When straight phosphate is used, about 800 pounds per acre of 0-16-0 is a common application. For straight nitrogen, about 500 pounds of 21-0-0 is usual, and for straight potash, about 200 pounds per acre. However, there are considerable variations from these levels.

Pesticides are conscientiously applied to combat the three main threats to grapes in Crete: Downy mildew, powdery mildew, and the grape moth Eudemis (Lobesia) botrana. Probably 99 percent of the spraying is done by portable hand-sprayers carried on the back.

One spraying of copper sulfate is usually adequate for downy mildew control except in an unusually moist season, when three to as many as six sprayings are necessary.

Powdery mildew is combatted by dusting with powdered sulfur, and DDT is used against the grape moth.

Crete is still free from phylloxera, a plant louse that infests plantings in most of Europe. Authorities are highly conscious of the danger of introducing the pest, and nurseries, though mostly privately owned, are under strict government regulation to prevent phylloxera infestation. A permit is needed from the anti-phylloxera council to sell grapevines, and importation of rootstocks from European countries or the mainland is prohibited. The Confederation of Sultana Grower Cooperatives (KSOS) has bought American rootstocks and is making selections for the best adapted strains as protection against the phylloxera should it strike the grape industries of Crete and the Peloponnesus (which is also free of phylloxera). Greek agriculturists are convinced that the introduction of the insect would be a catastrophe for the viticulture of Crete and the Peloponnesus.

Probably less than 10 percent of the sultana acreage in Crete is irrigated. When irrigation is practiced, it is carried on during the late winter and early spring when water is available in streams and springs. Irrigation has been found to cause a marked increase in yields on Crete; technicians state that yields are doubled. As a result growers are becoming interested in irrigation. However, water supplies are very limited, and Cretan experts believe that future development of Crete's water resources will not result in enough water to irrigate a large percentage of the sultana acreage.

According to the Rockefeller Foundation survey, 3/ the construction of storage dams would be generally impractical because of the highly seasonal character of the rains, scarcity of adequate streams, and the porosity of the underlying limestone formations. Also, the reservoir basins are generally small and the reservoirs would fill up in a short time with debris washed from the barren mountain slopes. However, small dams which divert water from small spring-fed streams for irrigation, millpower, and village water supplies are common and apparently practical.

Harvesting methods.--Harvesting of sultanas in Crete generally starts about August 20. In a late season, drying may begin at the end of August; in an early season, about mid-August. It takes 8 to 20 days--generally about 15 days--to dry the grapes. There is always a risk of rain because the dryest part of the summer is past. A late crop is particularly vulnerable to rain.

3/ c.f. Allbaugh.

The clusters are cut from the vines, dipped in potash solution, and laid in dry-yards for drying. The dry-yard is generally a level, weed-free, un-planted patch of ground adjacent to the vineyards. Probably over 90 percent of the sultanas in Crete are laid on paper on the ground to dry; the rest are dried on racks. The use of racks is a new, important development in Crete's drying technology. Should this development continue, it will greatly improve the quality and quantity of Cretan raisins in seasons when rain or damp weather occurs at harvesttime.

The Cretan Agricultural Extension Service and Agricultural Bank are strongly recommending that growers install these racks. They are simple homemade structures, consisting of four poles set in the ground in the form of a rectangle and framed at the top with four pieces of wood. Strands of wire are then fastened horizontally to the poles, the lowest levels of wires being a few inches above the ground, the next level a few inches higher and parallel to the lowest set, and so on up the frame, like the rungs of a ladder. (Two or three strands of wire would be equivalent to a rung.)

The overall dimensions are approximately 8 feet long, 3 feet wide, and $4\frac{1}{2}$ feet high. A typical rack contains about eight levels of wire, meaning that eight layers of clusters of grapes could be placed thereon for drying.

The main advantage of these drying racks is that in the event of rain, the water simply drips off the berries enabling them to dry freely with a minimum of mold or decay. Under the traditional method of drying on the ground, growers attempt to cover the fruit with tarpaulins or plastic when rain occurs; but, at best, heavy damage results under such conditions.

Also, growers possessing racks are under less pressure to harvest their sultanas early--to beat the rain. Therefore, they can permit the berries to attain an adequate sugar content before harvesting them.

Another benefit from the use of the racks is the savings in precious land area required for the drying operation. Greek technicians calculate that only one-seventh as much space is required for rack drying as for drying on the ground. Between 140 and 200 pounds of raisins can be accommodated on a rack. In the Iraklion area where most growers handle between 8,500 and 11,000 pounds of raisins each, approximately 60 frames would be required.

In 1958, the cost of a drying frame was \$3.30--\$2.30 for material and \$1.00 for labor. Sixty frames would, therefore, cost \$198, a very considerable figure for a Greek producer, since his annual gross farm income is only a few hundred dollars.

However, the Agricultural Bank is making loans to producers for the construction of drying racks. These loans are available to growers at much more favorable terms than usual. They are repayable in 4 to 5 years at 6-percent interest.

In districts where it is safe to extend harvesting over a longer period of time, growers stagger their drying operation; in these districts the grower would require fewer frames.

Agricultural experts in Crete are convinced that the use of drying racks is expanding. The harvesttime rains of 1957 which seriously damaged the pack is said to have stimulated growers' interest in racks.

Cost of production.--Agriculturists in Greece estimated that in 1957-58 the cost of production of Cretan raisins ranged between \$400 and \$535 per acre. This represents total costs, including, in addition to out-of-pocket costs, an allowance for family labor, land rent, and depreciation. If this range in costs is applied to the average Cretan yield of 3,800 pounds per acre, then the per-pound cost of production would range between 10.5 cents and 14.1 cents. The per-pound cost of production will, of course, vary considerably with the yield, and it must be borne in mind that yields vary considerably by areas--from 2,700 pounds in western Crete to 5,500 pounds in eastern Crete.

Probably the most typical situation is that of \$400 cost of production coupled with 3,800 pounds yield, resulting in a 10.5 cents per pound cost of production. It should be emphasized that this includes a return for family labor and use of the land. However, cash costs--for hired labor, fertilizer, and pesticides--are estimated at only \$135 per acre by Cretan agricultural officials. Cash outlay would, therefore, represent about one-third of the cost of production.

It is, therefore, understandable that while some agricultural leaders stated that the average grower support price of 9.38 cents per pound in 1957-58 was not profitable, this price level was attractive enough to growers to provide an incentive for the continued expansion of vineyards.

A comparison of the 10.5-cents cost-of-production estimate with 1958-59 support prices shows a fairly close correspondence between the two. Support prices to producers in 1958-59 ranged between 9.8 and 11.0 cents per pound, depending upon grade. The weighted average support price was considered to be 10.2 cents per pound.

Peloponnesus

The Peloponnesus, which has about one-third of Greece's sultana acreage, is the large peninsula which juts out from the Greek mainland west of Athens, and is separated from the mainland by the Gulf of Corinth on the north and Corinth Canal to the east.

The Peloponnesus is very mountainous, with only 20 percent of the land cultivable--mainly in the limited coastal plains and narrow river valleys. The climate is also of the Mediterranean type. Except in the higher elevations, rainfall is limited; the coastal plains receive 15 to 20 inches annually in some places and 20 to 30 inches in others. The summers are hot and dry; most of the rainfall occurs during the winter, which is mild.

Although the Pelopponnesus has about one-third of the country's sultana acreage, it produces only one-fifth of Greece's sultanas. According to the Greek Agricultural Bank, there were 14,512 acres of sultanas on the peninsula in 1956. Average (1953-57) sultana production is estimated as approximately 10,000 tons.

Most of the peninsula's sultanas are grown in the Province of Corinth--in the northeast. The Provincial agricultural office in 1958 estimated the area of sultanas in Corinth at 12,000 acres. Also, according to Provincial agricultural leaders, Corinth's sultana acreage is slowly declining. The Province is important too for dried currants, producing an average of about 10,000 tons. However, a larger acreage is required than for sultanas because currant yields are smaller. The same farmers do not produce both; sultanas are grown in the plains, as most of the soils there are considered suitable for them, and currants are grown in the hills.

Corinth is also an important producer of citrus particularly lemons. In recent years, some of the land devoted to sultana vines has been interplanted with lemon trees. As the trees reach maturity, the vines are pulled out. Although lemons have been generally considered more profitable than sultanas, in most recent years sultana prices have been extraordinarily high. Citrus prices have been declining as Spanish production recovered from the freeze damage incurred in the winter of 1956-57.

The most common size of operation for sultanas in Corinth is a little over $1\frac{1}{2}$ acres. Since average yields are approximately 1.7 short tons of raisins per acre, the average sultana farmer's annual production is not quite 2-3/4 tons. Unlike the situation in Crete, there is little technological change taking place in Corinth's sultana production, according to Greek agricultural technicians. They believe yields are static, and that Corinth's production of sultanas has apparently passed its peak.

As is the case in Crete, producers in Corinth are zealous in combating mildews. Approximately 170 pounds per acre of copper sulfate is applied against downy mildew and about the same quantity of sulfur for powdery mildew. However, downy mildew is more common on sultanas and powdery mildew more generally affects the currant vines. The grape moth is also a pest in Corinth and is kept under control with DDT spray. The Pelopponnesus is also free of phylloxera. Its vines are therefore still exclusively on European rootstocks. There is a strict quarantine on bringing plants into the Pelopponnesus that might possibly introduce the phylloxera insect.

Average fertilizer application, according to the Provincial Extension Service, consists of the following: 350 pounds of 21-percent nitrogen, 450 pounds of 16-percent phosphate, and 170 pounds of 42-percent potash per acre. In actual practice, of course, some producers apply more or less than these quantities.

Irrigation is more widely used here than in Crete. Possibly 90 percent of Corinth's sultana acreage receives two irrigations--in the winter and spring. The irrigation water flows by gravity through a network of concrete troughs into the vineyards.

Harvesting of sultanas usually begins about the 15th of August, a few days after the beginning of the currant harvest. Rain at drying time is uncommon, though it sometimes occurs--in 1 or 2 years in 10. Most of the drying is done on the ground in special drying beds. A small proportion is shade-dried on racks--possibly 10 percent; the rest is dried on cement beds or on paper. There is no pronounced shift, as in Crete, from ground drying to rack drying.

The cost of production has been roughly estimated at \$400 per acre, including wages for family labor and a charge for use of the land. This would mean a per-pound cost of production of 11.8 cents at the average yield of 3,400 pounds per acre. This cost figure is not to be taken too literally since it is based on rule-of-thumb information and not on any accurate records. It provides some indication, however, that sultanas are more expensive to produce in Corinth than in Iraklion (10.5 cents per pound), and also helps explain why Corinth's sultana acreage has been slipping while Iraklion's has been rising.

Utilization

Alternative Uses

Sultana grapes in Greece are used almost entirely for raisins. Only a small quantity is used commercially as a table grape--about 8,600 tons in 1955 and 8,200 tons in 1956--both in the domestic market and for export. By way of comparison, approximately 220,000 tons of sultanas were dried annually in the 1953-57 period. Hardly any sultana grapes are crushed for wine, except for some "second crop" grapes.

On the other hand, rosakis and tachtas are used mainly as table grapes and only a minor proportion is dried. A substantial volume of rosaki grapes is exported fresh. When rosaki clusters are cleaned for export, the culs are used for wine; these are very high in sugar and low in acid. Second-growth sultanas are mixed with these to raise the acid ratio.

Domestic Disappearance

The domestic disappearance of sultana raisins generally ranges between 3,000 and 5,000 tons annually. This includes both consumption of the edible grades as food and utilization of the low grades for industrial products. Fluctuations in disappearance are caused mostly by variations in the quantity of discarded berries, which in turn depend on the size and quality of the crop. Greek consumption of sultanas as such is probably not over 3,000 tons annually and variations in the volume consumed for food are not of much consequence.

Exports

As indicated earlier, Greek exports of raisins have averaged over 51,000 tons per year in the five most recent marketing years. This is an increase of nearly 75 percent over the average annual prewar export quantity of 29,530 tons. The sharpest gains have taken place in the most recent postwar years, as acreage planted in the years immediately following the war has come into full bearing. Peak exports of 64,302 tons were attained in the 1957-58 crop year, when Greek production was record large and important competitors like the United States and Turkey suffered short crops.

European countries (exclusive of the Soviet Union) provide the main market for Greek raisins; they take about 85 percent of Greek exports. The volume sold in Europe has increased greatly since the war.

By far the largest foreign outlet for Greek sultanas is West Germany, whose purchases are nearly double those of prewar Germany. Since German import statistics show no increase in total raisin imports compared with prewar, Greek gains were obviously at the expense of another source of supply, Turkey, whose exports to Germany are now but a small fraction of the pre-war level.

The United Kingdom is the second largest purchaser of Greek raisins but takes a much smaller volume than West Germany. Greek sales to the United Kingdom and the Irish Free State, combined, are slightly larger than before the World War II. Other European markets which are both substantial and have increased in importance are: Italy, Austria, and France.

The Soviet Union in recent years has bought over 3,000 tons annually. Before the War the Soviet Union did not import any raisins from Greece. However, this gain in Greek exports is partially offset by the decline in shipments to Czechoslovakia, Hungary, Poland, Rumania, and Yugoslavia.

The only important offshore markets, and increasing ones at that, have been Egypt and Japan.

The main export movement of Greek raisins occurs in the fall months. Heavy shipments begin in September. October is the month of heaviest shipments; in recent years October exports have averaged over 15,000 tons. November ranks with September for the second heaviest monthly volume. Exports taper off successively in December and January but are still substantial in those 2 months. By February 1, usually about three-fourths of the season's export movement has been completed.

Greece also exports a substantial volume of table grapes. These are mainly rosaki grapes and are largely from Crete. Almost all exports of fresh grapes take place between early August and late November. September is the peak month. Table grape exports, like raisin exports, have also increased substantially in recent years. In the 5 years from 1953 through 1957, exports averaged about 19,000 tons annually, or nearly twice as much as the annual volume in the 1949-52 period. West Germany is the largest foreign market, for table grapes, but the United Kingdom, Norway, and Austria are also important.

Table 2.--Raisin exports to specified countries, by country of destination, average 1934-38, 1949-52, and 1953-57, annual 1953-58

Country	Average		1949-52		1953-57		1954		1955		1956		1957		1958	
	1934-38	1/	1949-52	1/	1953	1/	1954	1/	1955	1/	1956	1/	1957	1/	1958	1/
	Short	tons	Short	tons	Short	tons	Short	tons	Short	tons	Short	tons	Short	tons	Short	tons
Austria.....	710	2,314	2,810	2,294	2,707	3,369	2,707	1,512	3,169	1,044	1,044	1,044	1,044	1,044	1,044	1,044
Belgium-Luxembourg.....	48	92	223	56	144	546	15	176	176	176	176	176	176	176	176	176
Czechoslovakia.....	1,522	277	480	436	1,011	1,499	529	529	529	529	529	529	529	529	529	529
Denmark.....	569	3,587	1,874	2,472	2,228	1,047	1,047	1,047	1,047	1,047	1,047	1,047	1,047	1,047	1,047	1,047
Finland.....	115	1,874	2,472	2,228	1,047	1,047	1,047	1,047	1,047	1,047	1,047	1,047	1,047	1,047	1,047	1,047
France.....	335	10,839	21,546	23,330	22,484	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Germany, E.	11,129	1	1	1	1	63	63	63	63	63	63	63	63	63	63	63
Germany, W.						2,116	2,198	2,931	2,931	2,931	2,931	2,931	2,931	2,931	2,931	2,931
Iceland.....						1,325	3,687	7,451	7,451	7,451	7,451	7,451	7,451	7,451	7,451	7,451
Ireland.....						1,256	148	639	278	278	278	278	278	278	278	278
Italy.....						18	669	645	1,102	1,102	1,102	1,102	1,102	1,102	1,102	1,102
Netherlands.....						310	310	139	139	139	139	139	139	139	139	139
Norway.....						310	202	84	53	53	53	53	53	53	53	53
Romania.....						159	192	313	384	384	384	384	384	384	384	384
Spain.....						159	137	14	72	72	72	72	72	72	72	72
Sweden.....						6,777	3,209	4,992	2,016	2,016	2,016	2,016	2,016	2,016	2,016	2,016
Switzerland.....						2,778	328	1,153	1,422	1,422	1,422	1,422	1,422	1,422	1,422	1,422
Trieste.....						363	363	363	363	363	363	363	363	363	363	363
United Kingdom.....						452	452	452	452	452	452	452	452	452	452	452
Yugoslavia.....						28,831	30,789	43,591	47,832	47,832	47,832	47,832	47,832	47,832	47,832	47,832
Hungary.....						9	74	30	90	90	90	90	90	90	90	90
Poland-Danzig.....						182	560	1,152	1,434	1,434	1,434	1,434	1,434	1,434	1,434	1,434
Total Europe.....						195	195	158	789	789	789	789	789	789	789	789
United States.....						94	4374	3,146	2,228	2,228	2,228	2,228	2,228	2,228	2,228	2,228
Ceylon.....						508	4,374	2,228	2,583	2,583	2,583	2,583	2,583	2,583	2,583	2,583
Egypt.....						29,530	36,086	51,270	52,833	52,833	52,833	52,833	52,833	52,833	52,833	52,833
Israel.....						182	182	182	182	182	182	182	182	182	182	182
Japan.....						195	195	148	105	105	105	105	105	105	105	105
Lebanon.....						195	195	137	137	137	137	137	137	137	137	137
Tunisia.....						195	195	1,819	1,996	1,996	1,996	1,996	1,996	1,996	1,996	1,996
U.S.S.R.						508	4,374	4,374	4,117	4,117	4,117	4,117	4,117	4,117	4,117	4,117
Other countries.....						29,530	36,086	51,270	52,833	52,833	52,833	52,833	52,833	52,833	52,833	52,833
Total.....						182	182	182	182	182	182	182	182	182	182	182

1/ Calendar year. 2/ Six months, September-February.

There has been some Greek interest in developing exports of table grapes to the United States. At this writing no export movement to the United States had materialized because of the difficulties posed by plant quarantine regulations. These require cold treatment for Mediterranean fruit fly and fumigation for the grape moth.

Processing

Packinghouses

In early 1958 there were 24 raisin packinghouses in Crete and 8 in the Peloponnesus. The bulk of Crete's raisins are processed in Iraklion, where there are 14 packinghouses with a capacity of over 10,000 short tons per month when operated 8 hours daily.

With Crete's sultana production expanding, this capacity is no longer adequate, particularly in a season of bumper harvest. In September and October 1957, for instance, the raisin factories had to operate overtime to process the bulk of the crop before the period of peak demand had passed. This resulted in overtime wage rates which, of course, raised the cost of packing.

The packinghouses are generally old--dating back to the 1920's--and are not laid out along the most efficient lines. Some Greek trade sources feel that packing costs are unduly high because of a lack of modern layout and labor-saving procedures, and they believe that storage facilities are inadequate. However, as in the production field, a dynamic expansion of processing capacity has been taking place in Iraklion. Influential elements of the Greek trade are convinced that Greek exports will increase if there is additional packing capacity and, therefore, quicker processing of the crop.

In 1958, the Confederation of Sultana Co-operatives let out bids for the construction of a sultana packinghouse in Iraklion. The plant was practically completed by the beginning of the 1959-60 season. Its initial capacity is $27\frac{1}{2}$ short tons per 8-hour shift. However, it is expected to expand its capacity to 110 tons per 8 hours, or nearly 3,000 tons per month on a single shift. Although the Confederation had exported only small quantities in the past, it could now become a very substantial exporter.

In early 1958 a new wing to the plant of the Cretan Sultana Growers Corporation in Iraklion was already under construction and has since been completed. The management now expects to be able to process approximately 7,000 short tons a season, or nearly twice its previous capacity. However, it is already planning to further expand its plant.

Since the Greek internal market absorbs a very small proportion of the sultana crop, these increases in processing capacity can be considered as increases in the export pack.

Processing Methods

The following procedure is typical in the Iraklion raisin packinghouses:

1. Raisins are received in burlap bags already declustered by growers.
2. Growers' deliveries are graded according to color and size of berry.
3. Berries are washed by hand.
4. They are placed in shallow trays on racks in sulfur chambers (except for No. 4 Naturals, which are not sulfured).
5. After sulfuring, raisins are put in drying chambers.
6. Berries are then coated with mineral oil and placed in separate piles on floor, each pile representing a different grade.
7. Raisins are shoveled from piles through hole in floor into de-stemming machine below. (This consists of a revolving cylinder enclosing a center shaft bearing blades which push the raisins against the wire-mesh cylinder wall and thereby rub off the cap stems.)
8. Raisins pass over shaker-sieves, which drop out small berries and stones. (This step is omitted for the No. 4 Natural grade.)
9. Raisins move over belt, where women cull out defective berries and handpick for top grades.
10. They are packed in boxes of various sizes.

Upon completion of processing, most Greek sultanas are distinctly lighter in color than California Natural Thompsons but not as light as California Golden Bleached. The reason for this intermediate color is that all Greek sultanas (except No. 4 Naturals) are sulfured after they have been sun-dried. With this method, the burning sulfur does not result in as golden a color as when fresh grapes are subjected to sulfurization and then dehydrated. The use of drying "trellises" by Iraklion growers is another method which may eventually result in lighter colored raisins. Greek raisin experts are suggesting that the growers cover the drying frame with lightweight, airtight material and burn some sulfur on the ground, within the frame, so that the fresh grapes would be subjected to the sulfur dioxide. This would give their sultanas a lighter, more golden-yellow color than is now the case.

Packaging

Until recently, almost the entire crop was packed in bulk, in wooden boxes. During the last few years, however, more and more foreign buyers have expressed a preference for cardboard containers. At present, approximately half of the sultana exports are in cardboard boxes, and it is anticipated that pasteboard packing will continue to gain wider use.

Exports in small consumer packs of 250, 300, and 500 grams have also been gaining ground the past few years. In 1957-58 about 1,600 short tons of sultanas were exported in consumer packages, primarily to central European and Scandinavian countries. In 1958-59, about 6,500 tons were reportedly exported in such packages. Some 50-gram packets have also been used for export. Cellophane, polyethylene, and thin cardboard have been used for the consumer-size packages.

In the case of bulk packs, the pasteboard boxes generally contain 15 kilograms (33 pounds) net, and the wood boxes 17 kilograms (37.5 pounds) net.

Pasteboard boxes are more economical because of their lighter shipping weight, but they have to be handled more carefully, or they may buckle. In the past, only the lower grades were packed in cardboard for use by bakers. The Greek Government inspects the packaging of raisins for export.

Costs

The cost of processing varies materially between firms in any season, and also varies between seasons, depending on the size and quality of the crop.

The cost of processing, i.e., the spread between the price paid to the grower and the f.o.b. packinghouse price for the final product, is estimated by the Greek trade, by grades, as follows:

<u>Dollars per short ton</u>		
No. 0	Bleached (top grade).....	80 - 85
No. 1	Bleached.....	70 - 80
No. 2	Bleached.....	65 - 70
No. 4	Bleached.....	65
No. 4	Natural.....	50

A principal factor in this cost is the considerable work of picking over by hand for color and berry size for the bleached grades. There is no selection for color or size in the case of No. 4 Naturals. (Incidentally, the Greek trade does not provide for a No. 3 grade.)

The packinghouses employ both men and women. Men are usually paid on a piecework basis and women are paid by the day. Men handling sultanas within the plant received not quite one-fifth of a cent per pound in 1958. Those sealing containers--wooden or pasteboard--were paid about $1\frac{1}{2}$ cents

per box. The average daily earnings for a man were about \$1.70; the daily wage for a woman about \$1.10. The employer also contributed an additional 22 percent for social security, health insurance, life insurance, and other fringe items. Overtime pay, effective after 8 hours, is at the following rates: 25 percent extra per hour between 6:00 and 8:00 p.m.; 50 percent extra per hour between 8:00 and 10:00 p.m.; 100 percent extra per hour after 10:00 p.m. By way of comparison, average pay for field labor in the vineyards is about \$2.00 per day for men.

There is a wide range in productivity of packinghouse labor, depending on the layout of individual plants.

Table 3.--Daily production, employment, and output per person employed in 11 Iraklion raisin factories, 1948

Factory	Production per 8 hours	Laborers and employees	Daily production per person employed
	Short tons	Number	Short tons
A.....	66	360	0.18
B.....	33	180	.18
C.....	22	13	1.69
D.....	17.5	15	1.17
E.....	16.5	50	.33
F.....	6.5	8	.81
G.....	16.5	82	.20
H.....	6.5	10	.65
I.....	11.0	53	.21
J.....	6.5	8	.81
K.....	10.0	8	1.25
Average...	19.3	72	.27

Source: Based on data from Rockefeller Survey, c.f. Allbaugh.

Grades

The Greek trade makes use of five major grades--0, 1, 2, 4, and 4 Natural--and two secondary grades--21 and 24. The specifications for each of the grades are as follows:

No. 0 (Bleached)--Largest berries; uniform light color, no other color permitted.

No. 1 (Bleached)--Slightly smaller berries; also 4 to 5 percent tolerance of small berries; color same as for 0.

No. 2 (Bleached)--Slightly smaller berries than 1; small-berry tolerance of 6 to 7 percent; small percentage of dark ("brown") berries permitted.

No. 4 (Bleached)--6 to 7 percent small berries permitted (as for 2); only 60 to 65 percent of berries must be light color.

No. 4 Natural--Most of berries "brown."

No. 21--Small-sized berries from sieving Grades 0 and 1.

No. 24--Small-sized berries from sievings of No. 2 and No. 4 Bleached.

Most seasons a sultana pack consists of about 50 percent of No. 4 and lower and 50 percent of No. 2, No. 1, and No. 0. In 1957-58, when there was rain damage, 70 percent of the berries were graded No. 4 or lower and the remainder No. 2 and better. In 1958-59 the crop was unusually good and only 25 percent were graded for the poorer qualities and 75 percent for No. 2, No. 1, and No. 0.

Export Standards

There is no mandatory inspection by the government to ensure compliance with the above grade standards, though the Confederation of Sultana Cooperatives has attempted to make these grades mandatory under government supervision.

Since August 1955, however, the Greek Government has carried out compulsory inspection of export sultanas for the following standards. These standards were further tightened July 1958. They are:

1. Freedom from pests and disease.

2. Freedom from excessive cap stems--12 cap stems permitted per 100 berries.

3. Freedom from waste or foreign matter, with a tolerance of 2 parts per 1,000 (formerly 5 parts).

4. Freedom from undesirable flavors.

5. Moisture content not to exceed 16 percent (formerly 18 percent).

According to Greek packers, these regulations were not strictly enforced the first season (1955-56) but enforcement since has become progressively stricter. It is also required that the grade be shown on the containers. However, no authorization exists for inspection of the contents to ascertain whether the grade has been accurately designated.

The 1958 decree promulgated new standards for pasteboard boxes and also covered packing in consumer-size containers.

Important elements in the Greek raisin industry are interested in tightening up the grading of raisins for the export market. Improved grading, they are convinced, will enhance the sale of Greek sultanas in foreign markets.

Prices

The price differential between the top and bottom Greek sultana grades is considerable. For most of the 1955-56, 1956-57, and 1957-58 seasons, there was a spread of $2\frac{1}{2}$ to $3\frac{1}{2}$ cents per pound between No. 0 and No. 4 Natural grades. This spread was narrowed in the 1958-59 season because natural (unbleached) raisin prices had experienced the greatest increase in a remarkable upsurge of raisin prices, which began in 1955-56 and reached its highest point in 1958-59.

Table 4---Price comparisons of Greek, Turkish, and California raisins, f.o.b., 1/ by types, selected periods, 1955-59

Year and month	Greek grades			Turkish			United States		
	:			:			:		
	:			No. 4			:		
	No. 0	No. 1	No. 2	No. 4	Natu-	No. 9	No. 10	select,	Bleached
	ral							bulk	Fancy
	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents	Cents
	: per	: per	: per	: per	: per	: per	: per	: per	: per
	: pound	: pound	: pound	: pound	: pound	: pound	: pound	: pound	: pound
1955-56	September...	14.1	13.6	12.0	11.6	11.0	12.2	12.8	11.5
	October.....	14.3	13.7	12.5	11.9	11.1	11.6	12.3	12.0
	November....	16.1	15.4	13.7	13.2	12.6	13.4	14.0	11.5
	January....	16.6	15.8	14.4	14.2	--	14.4	14.9	11.5
	:								13.5
1956-57	September...	17.6	17.0	15.2	14.2	13.6	13.4	14.5	12.1
	October.....	16.1	15.6	13.9	13.5	13.5	13.4	14.4	12.1
	November....	16.1	15.6	13.9	13.5	13.1	13.2	14.0	12.5
	December....	16.1	15.6	13.9	13.5	13.4	13.2	13.7	12.5
	January....	16.1	15.6	13.9	13.4	13.1	12.6	13.5	12.5
	February....	16.1	15.6	13.9	13.7	13.1	12.6	13.3	12.5
	March.....	16.2	15.7	14.0	13.8	13.2	12.7	13.6	12.5
	:								--
1957-58	September...	15.8	15.2	13.6	13.2	--	14.6	14.9	12.9
	October.....	17.1	15.9	14.6	14.4	13.5	15.6	16.1	14.5
	November....	17.8	17.3	16.0	14.9	14.6	14.7	15.4	16.5
	December....	17.8	17.3	16.0	14.7	15.0	15.5	16.1	17.5
	January....	15.9	15.5	13.9	13.4	13.0	14.8	15.3	18.5
	February....	--	--	--	--	--	15.5	16.3	18.5
	March.....	--	--	--	--	--	15.6	16.4	19.0
	:								--
1958-59	September...	17.8	17.4	16.4	16.0	15.9	15.7	16.3	--
	October.....	19.1	18.8	18.0	18.0	17.5	16.7	17.3	--
	November....	19.5	19.1	18.5	18.2	--	17.3	17.3	26.5
	December....	19.1	18.8	18.0	17.8	--	17.5	17.9	26.5
	January....	--	--	--	17.2	17.8	16.8	17.6	26.5

1/ F.o.b. Greek and Turkish port, f.o.b. California packinghouse.

Between any two Greek grades the greatest differential seems to be between No. 1 and No. 2, judging from price data of recent seasons. The average spread in these four seasons between No. 1 and No. 2 was 1.35 cents compared with average differentials of 0.54 cents between No. 0 and No. 1, 0.46 cents between No. 2 and No. 4, and 0.52 cents between No. 4 (Bleached) and No. 4 Naturals.

The spread between No. 4 naturals and the other grades began narrowing in 1957-58, when export supplies of California Natural Thompsons decreased. The continuing shortage of California raisins in 1958-59 further stimulated the demand for Greek Naturals, so that at times the latter were selling at prices even higher than those of bleached raisins.

Pricewise, California Golden Bleached Fancy raisins have generally been closest to Greek No. 1 and No. 2 sultanas. Some European importers consider Greek No. 2 as most comparable to Golden Bleached Fancy and Greek No. 4 Bleached most similar to California Extra Choice Golden Bleached. However, since U. S. prices rose astronomically because of the short 1957 and 1958 California crops, Golden Bleached Fancy was substantially higher priced than even No. 0 grade in 1958-59.

In comparing Greek grades with those of Turkey (the main competitor of Greece in the all-important European market) No. 10 Turkish sultanas most closely approximate Greek No. 2 in price. At times though, Greek No. 4 Bleached have been fairly close in price to Turkish No. 10. Turkish No. 9 sultanas have been most similar in price to No. 4 Bleached of the Greek grades. At times, as in 1956-57, they have been quoted at prices closest to those of No. 4 Naturals.

Greek prices--for all grades--as well as prices of competing countries' raisins dropped sharply at the beginning of the 1959-60 season when it became apparent that 1959 world production would be considerably larger than in previous years. The devaluation of the Turkish exchange rate on raisins in August 1959 was followed by a precipitous decline in Turkish export prices, which had an important effect on Greek prices. Nevertheless, the grower "security" price of 10.6 cents per pound set by the Greek Government for 1959-60, was above the 10.3 cents "security" level established for 1958-59. However, in marked contrast to 1958-59, Greek prices in early 1959-60 were hovering at about the security level instead of substantially above it.

Producer Organizations

The Confederation of Sultana Co-operatives, KSOS, is the all-important sultana producers' organization. It is described in Greece as a "third degree" cooperative. The structure of this cooperative may be likened to a pyramid: there are thousands of grower members at its base who are organized into 600 local cooperatives, which in turn are merged into 13 federations, and the federations are joined together at the apex, as a Confederation.

The main functions of the local cooperatives are as follows:

1. To assist growers to obtain loans from the Agricultural Bank.
2. To help growers procure agricultural supplies and equipment.
3. To assist growers in the marketing of sultanas. The local co-ops carry out this function without attempting to process or otherwise handle the sultanas.

The Confederation, i.e., the top level, has as its main purpose, "the protection of the grower' interests." In attempting to do this, it carries out the following functions:

1. Strengthens the sultana market by purchases from growers.
2. Informs producers of market conditions abroad.
3. Guides farmers to improve cultural practices, increase efficiency, and improve their drying and handling methods.
4. Exports sultanas.
5. Sets high standards for its own exports to serve as an example for independent exporters.

KSOS actually has quasi-government status since it is empowered by legislation to protect the raisin producers' interests. The Minister of Agriculture and the Minister of Commerce are represented on the Administrative Council of KSOS. In addition, the representative of the Ministry of Commerce participates in the Executive Committee of KSOS.

Once the Greek Government, at the request of the Ministers of Agriculture and Commerce, has set a security price and fixed the quantity to be purchased by KSOS at this price, KSOS is obliged to purchase this quantity of sultanas, if offered by the growers.

KSOS' activities are financed by two major sources of revenue:

1. A levy of \$1.51 per short ton of sultanas and tachtas exported.
2. 10 percent of the profits earned by the Alcohol Monopoly in the importation and sale of molasses or other raw materials used in the production of alcohol.

The extent to which KSOS may draw upon these revenues each season must first be determined by the government and is then implemented by the Ministers of Commerce and Finance.

Raisins purchased by KSOS have usually been sold back to Greek packers who exported the raisins on their own account. In 1953-54 KSOS began exporting some raisins on its own, and has been steadily increasing its

export activity until it is now an important export factor. In 1957-58, it reportedly exported over 4,000 tons. With completion of its new plant in Iraklion, its export capabilities will be considerably greater.

In buying raisins from producers, KSOS is required to first pay the Agricultural Bank any debts incurred by the producers against their current crop. KSOS then gives the producers the remainder in three installments: One-third cash, one-third 2 months from date of sale, and the last one-third 4 months from date of sale.

Incidentally, independent exporters receiving credit from the Greek Government are also responsible for first paying their growers' debts to the Agricultural Bank and then paying the remainder to the grower.

Another important sultana organization is the Cretan Sultana Growers' Corporation, which is located in Iraklion and operates one of the largest sultana packinghouses in Greece. It derives 20 percent of its capital from the Agricultural Bank, 23 percent from the Union of Agricultural Co-operatives of Iraklion, 14 percent from 28 local cooperatives, and 43 percent from 800 individual growers.

It buys, grades, packs, and exports sultanas. Construction of expanded capacity--completed in 1958--reportedly gives it the greatest sultana-packing capacity in the country.

Since the Agricultural Bank and cooperatives contribute over 50 percent of the capital, they have a controlling influence on the policies of the corporation. As a result, overriding policy is to obtain the best possible returns for the growers who supply sultanas to the Corporation. Sometimes the corporation incurs a deficit because of this policy. However, in such an event, the deficit is made good from the capital reserves which are replenished in a good season. Neither the Agricultural Bank nor the government covers any loss.

When the corporation makes money, part of the earnings go to stockholders and part to the producers who supplied the raisins. Despite the bank's role, the corporation considers itself strictly nongovernmental.

Governmental Policy

Production and Export Goals

The Greek Government is committed to a policy of expanding the production and exportation of raisins. Not only has it been successful in its efforts to bring about such expansion since the war, but it is planning further substantial increases within the next few years.

The "Preliminary Five Year Program for the Economic Development of Greece, 1959-63," as released in April 1959, envisions the annual exportation of 77,000 short tons of raisins by 1963. By way of comparison, in 1949-52, exports averaged 36,086 tons and in 1953-57, 51,270 tons annually. The goal would exceed by 20 percent the alltime high level of exports--64,307 tons--

attained in the bumper crop year of 1957-58. An export volume of 77,000 tons implies an 80,000-ton production level, and this would be nearly half again as large as the 1953-57 average crop of 54,800 tons.

This production goal may be difficult to attain by 1963. If sultana acreage in Crete expands at the rate indicated by Cretan agriculturists, and if present average yields remain unchanged, total Greek production by 1963 would be closer to 70,000 tons than 80,000 tons. By 1968, however, Greece may achieve an average pack of 75,000 to 80,000 tons.

The export goal of the Five Year Program may also be somewhat optimistic although it was determined "on the basis of special studies on the potentialities of placing such products in foreign markets and also taking into consideration the trade policy to be followed in this connection." In 1957-58 when the record export volume of 64,307 tons was attained, supplies of raisins from competing countries were unusually short. Because of poor crops in Turkey and the United States that season, competitive production was 50,000 tons below normal, which aided Greek exports. The Greek Government is undoubtedly depending on increased markets as population grows in European countries. However, this additional demand may be offset by greater production of raisins not only in Greece, but also in Iran, Turkey, the United States, and Australia.

Export Programs

Exports are being directly encouraged by export promotions, trade missions, and, most particularly, by bilateral trade agreements. Under these agreements, the Greek Government permits the importation of another country's products if the other country in turn grants preference to the entry of Greek products.

Under the price support program, it is also possible for KSOS to export at a loss, if need be. However, since the inception of KSOS' price support purchases, it has not been necessary for KSOS to subsidize exports. The 1959-60 season may be the first real test.

The Greek Government is also making use of indirect measures to promote foreign acceptance of Greek raisins. In addition to the quality control regulations already in effect, legislation entitled "Control of Greek Export Trade" was submitted to Parliament in July 1959. The purpose of this latest legislation is to improve and standardize the quality and delivery of Greek exports and adapt them to international market requirements. The bill contains provisions for (1) determining who may and may not engage in export trade; (2) establishing standards and a "code of ethics" for exporters; (3) making changes in mechanics of export control; (4) setting up disciplinary councils and penalties for violators; (5) establishing criteria of responsibility, including "guilt by association" among members of same or affiliated export enterprises. The bill also provides for additional commercial attache positions at Greek missions abroad and sets up an Export Advisory Council in the Ministry of Commerce. It also validates an earlier administrative decision to reduce bank loan interest rates to export industries.

Production Aids

The Greek Government has encouraged production expansion by means of support prices, agricultural credit, and extension activities.

Support prices.--In 1956 the Greek parliament passed legislation making price supports available to sultana producers. Under this law, the Ministers of Commerce and Agriculture jointly set a "security" price in July of each year, and also determine the quantity of sultanas that KSOS will be authorized to buy at the "security", i.e., support price in the course of the marketing season.

Support prices were set as follows in recent seasons: 1956-57, 9.6 cents per pound; 1957-58, 9.4 cents; 1958-59, 10.2 cents; and 1959-60, 10.6 cents. These are "average" support prices. In any one season there is a range of support prices, depending upon grade. In 1958-59, for example, they varied from 9.8 to 11.0 cents per pound.

In 1957-58 and again in 1958-59, sufficient funds were allocated to KSOS to permit the purchase of 11,000 tons of sultanas for price support purposes. However, producers offered only negligible quantities to KSOS because they were able to obtain higher prices from packers because of the strong international market in those seasons.

Agricultural credit.--The Agricultural Bank of Greece has played an active and effective role in the expansion of sultana production. It makes short-term (one crop season) and medium-term (up to 5 years) loans to sultana producers. The greater portion of its loans are short term, to cover fertilization, spraying, and cultivation and harvest labor costs. On the average, about \$135 per acre covers all cash costs. The loan may be in the form of cash or just fertilizer and pesticide.

Medium-term loans are available for planting land to sultanas. A great percentage of Crete's sultana expansion has been partially financed by the bank. The bank considers the development of new sultana acreage a sound basis for loans because (1) the soil and climate are considered ideal for sultanas, and (2) Crete's excess labor can be used in sultana production. The bank, therefore, sets aside funds each year for medium-term loans to finance the expansion of sultana acreage.

Only the preparation of the land can be financed when loans are made for new plantings. Approximately \$67 per acre is available for this purpose under these medium-term loans. The interest rate is 6 percent--considerably less than what producers would have to pay to other lenders.

Medium-term loans are also made for the construction of drying frames in the vineyards and for irrigation of existing plantings.

As mentioned earlier, more favorable interest rates will be made available to exporters. In some seasons, credit has also been made specially available to sultana exporters by the Government.

Extension activities.--Inspired by the example of the U. S. Extension Service, the Greek Extension Service has developed remarkably since World War II--not only in terms of manpower, but also in the quality of its work.

Extension Service offices were visited in several Provinces in Crete and the Peloponnesus in 1958. The personnel appeared to be both well informed and keenly interested in helping their farmers learn to apply improved practices. Farmers seemed to have an excellent opinion of the extension work and there was a growing awareness among them of the need to avail themselves of the services of the "county agent."

In the Province of Khania in western Crete, 8 of the 13 government agriculturists were extension men. The Iraklion Province had 16 agriculturists, of whom 8 were extension men--one each in 7 villages and a director. However, at the Provincial headquarters, in the city of Iraklion, it was pointed out that the Province contained 37,000 farm families.

Since Greece's financial resources are quite limited, the country can never develop the degree of extension coverage that exists in the United States. Also, as the Extension Service has expanded, there has been difficulty in obtaining qualified personnel.

All in all, however, Greece can be credited with having developed a relatively modern extension service that can well serve as a model for neighboring countries.

The Agricultural Bank of Greece also carries out valuable extension work in viticulture. It has a "Technical Director" in several of the Provinces who is qualified to advise farmers applying for loans on improved practices.

Outlook

Greek raisin production should be materially higher in the coming decade than in the previous one. By 1963, Greek production may well attain an annual average of 70,000 tons compared with 55,000 tons in the 1953-57 period. By 1968, it may reach 75,000 to 80,000 tons.

All of the envisioned increase would take place as a result of expanded acreage in Cretan sultanas. Production of sultanas in Corinth is expected to remain nearly stationary or decline slowly. Output of other types of raisins, namely, rosakis and tachtas, is not expected to change much.

It is likely that expanding packinghouse capacity in Crete will be able to keep pace with the greater field production.

It also appears that the quality of Cretan sultanas will gradually improve owing to better drying and harvesting methods by growers, more modern processing techniques in packinghouses, and stricter inspection and grading of the export pack. It can be anticipated that a larger proportion of the export pack will be in consumer-size containers.

Increases in production will be directly reflected in a larger availability for export. It is unlikely that domestic consumption of raisins in Greece can absorb an appreciable proportion of the expanded output.

The Greek Government's export goal of 77,000 tons per year by 1963 may be difficult to attain. First, production may not be large enough by 1963 to permit an export surplus of that magnitude; it may require an additional 5 years, i.e., 1968, before Greece has an export availability of 77,000 tons. Secondly, international supply and demand by 1963 may not permit such an expansion of Greek raisin exports, (In the 1953-57 period they averaged 51,270 tons.) There have been signs of increasing production and export availabilities in Iran, Turkey, the United States, and Australia. It is doubtful that world consumption of raisins will increase as much as their production.

Up till 1959-60, neither the Greek producer nor the Greek Government has yet experienced severe export competition. Shortfalls in the production of one or another important competing country have presented Greece with favorable export opportunities as its production has successively attained new highs. However, in years when virtually all of the competitors have large packs, the Greek grower may be faced with substantially lower prices than in recent years and the Greek Government may face the possibility of financial losses in underwriting "security" prices.

UNITED STATES DEPARTMENT OF AGRICULTURE
WASHINGTON 25, D. C.

POSTAGE AND FEES PAID
U. S. Department of Agriculture

Official Business